



# Ship/Lighter/Platform Fendering

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- Problem
- Deep Draft Composite Fender
- Testing
- FY03 Plan

# Existing Fenders

- 32" x 50" foam filled sausage





# Problem

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- Existing fenders not Sea State 3 capable
  - Fender failure
  - Interface issues due to different lighterage configurations



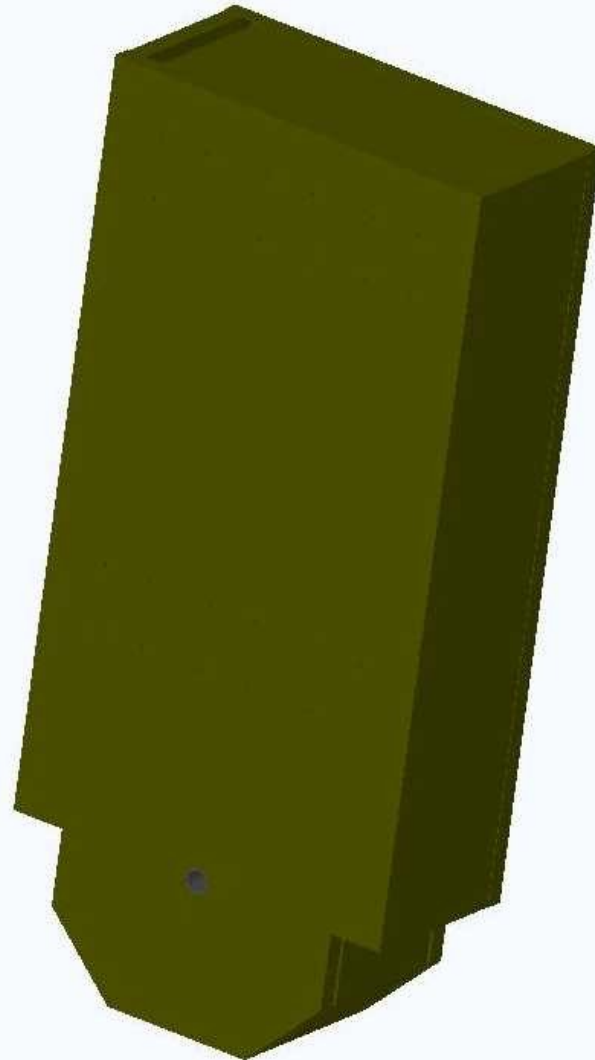
# Deep Draft Composite Fender

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- High-strength composite construction
  - Configured for use with wide range of lighters
  - Provides 6-foot standoff
  - Provides low pressure on hull of ship
  - Deep draft / high inertia stability features
  - 'Unsinkable' construction



# Deep Draft Composite Fender

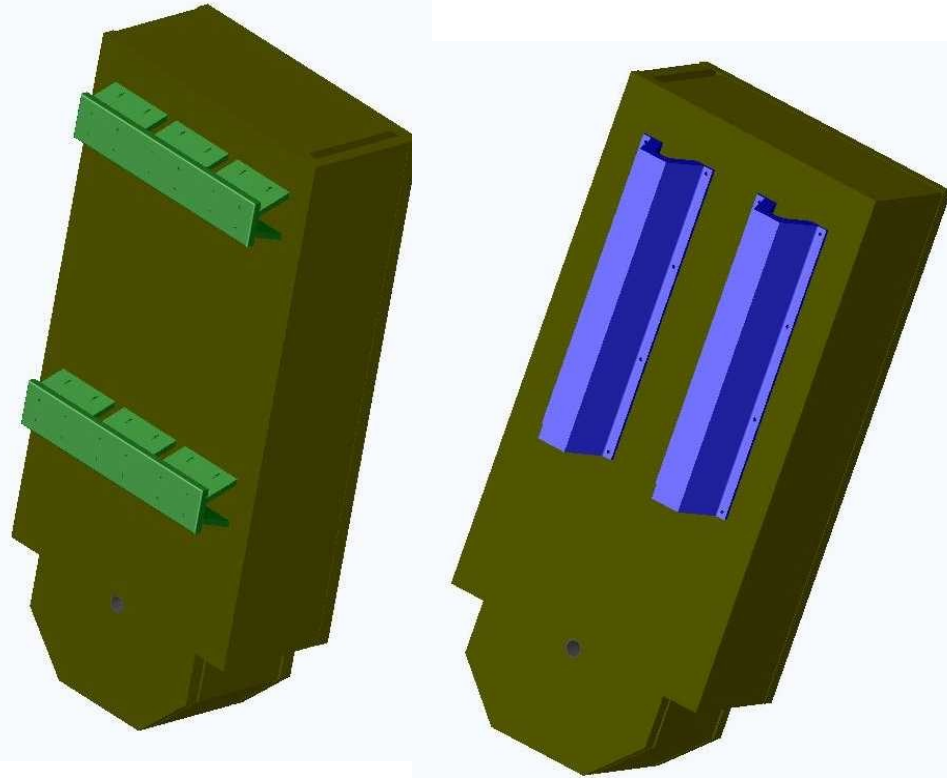
- Fender units
  - Composite Comp





# Deep Draft Composite Fender

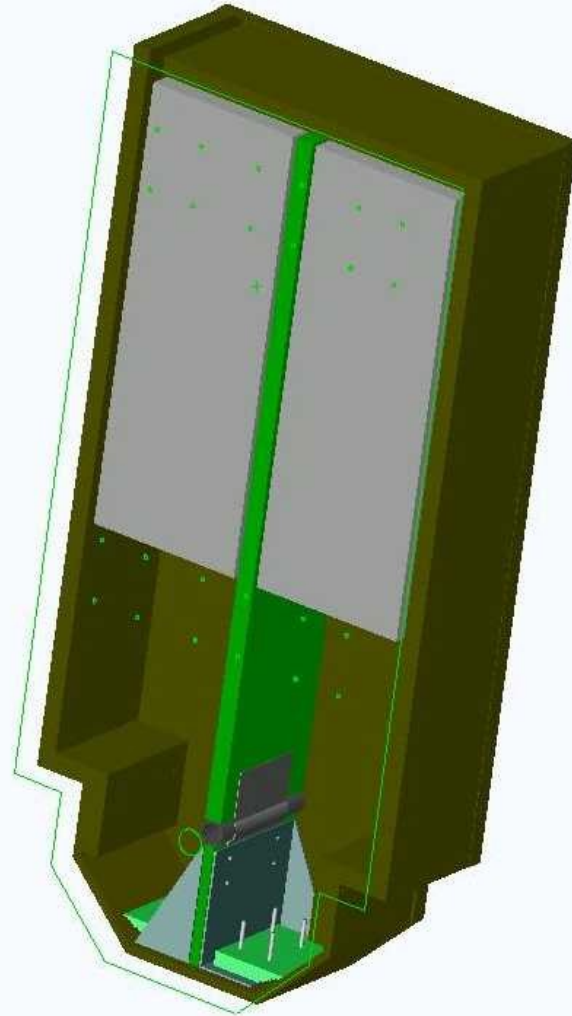
- Fender units
  - Composite box
  - Cushions





# Deep Draft Composite Fender

- Fender units
  - Composite box
  - Cushions
  - Foam flotation block

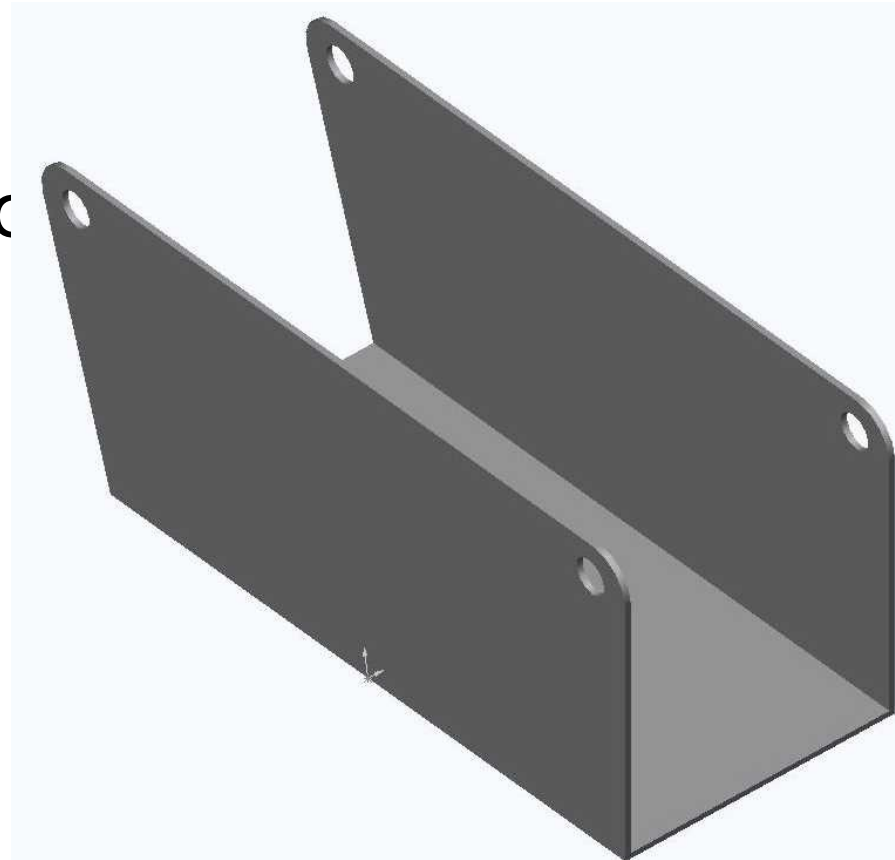




# Deep Draft Composite Fender

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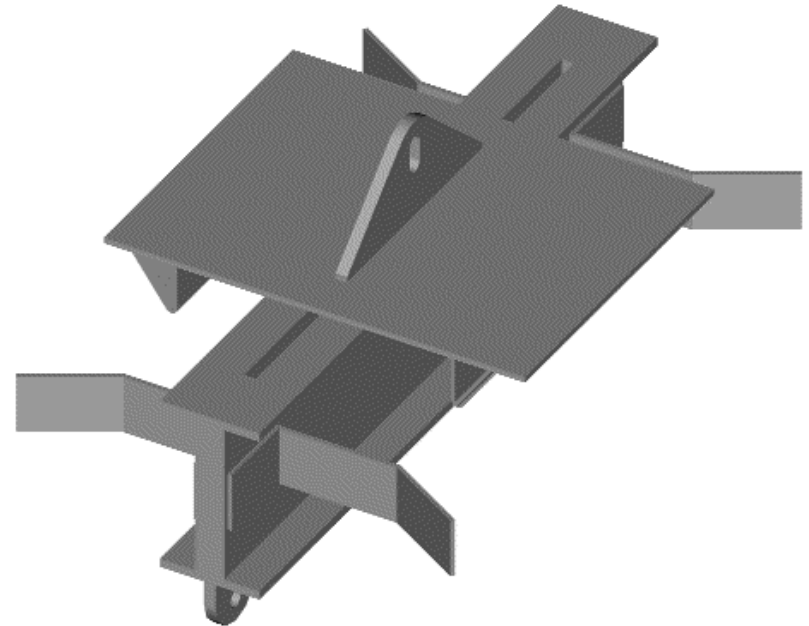
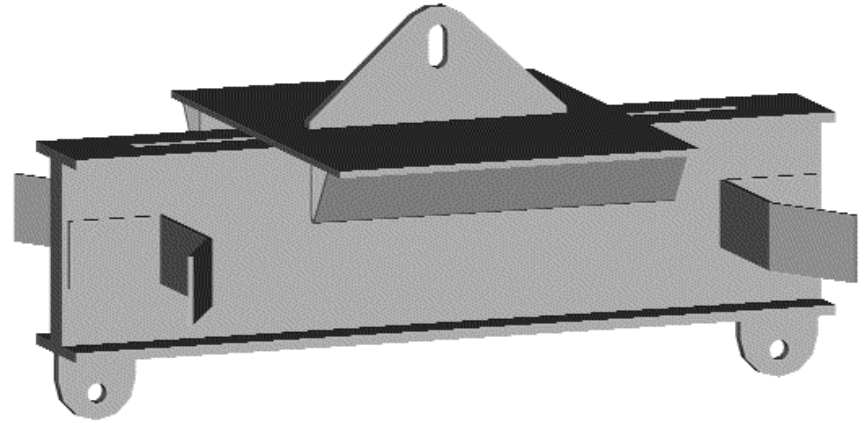
- Fender units
  - Composite box
  - Cushions
  - Foam flotation block
- Weight Tray





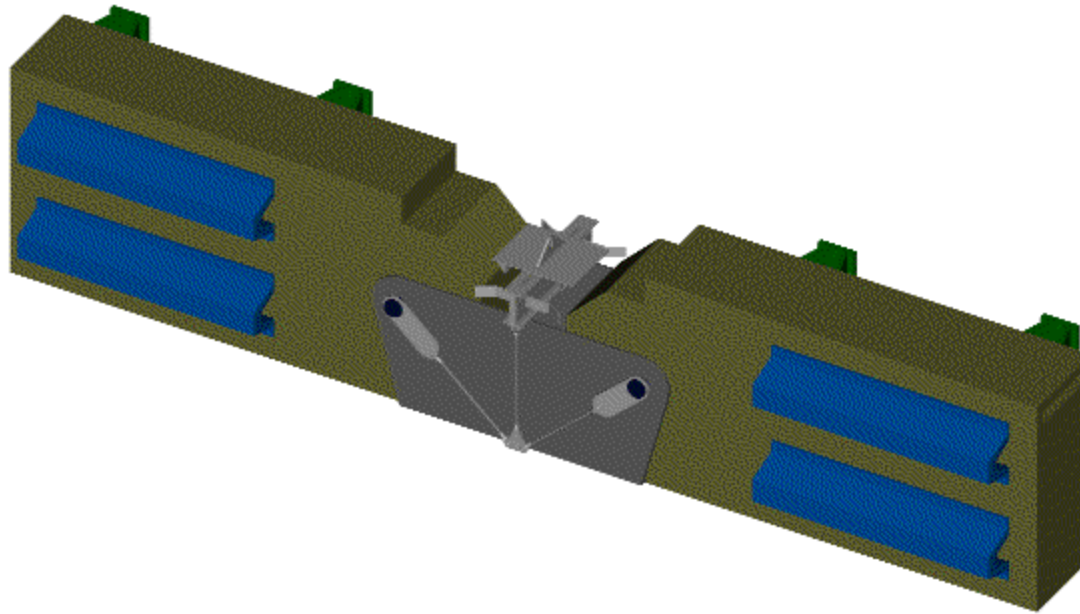
# Deep Draft Composite Fender

- Fender units
  - Composite box
  - Cushions
  - Foam flotation block
- Weight Tray
- Spreader Bar





# Deep Draft Composite Fender



Principal  
Characteristics,  
Transport &  
Stowed

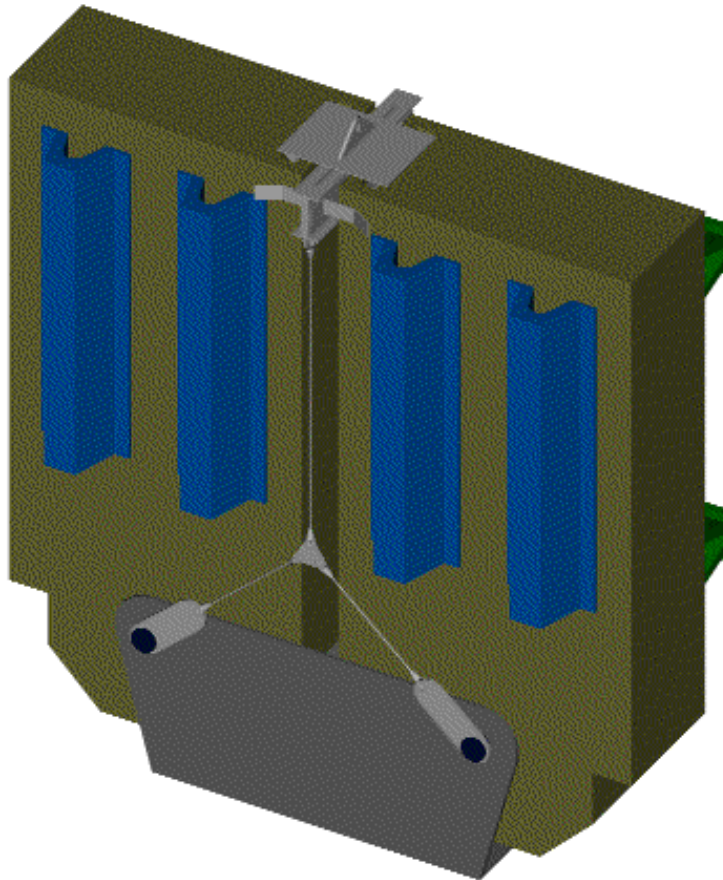
Length.....  
.....38'

Width.....  
.....6'

Height.....  
8'



# Deep Draft Composite Fender



Principal  
Characteristics, Deployed

Length.....  
....17'

Width....  
.....6'

Height.....  
18'



# Deep Draft Composite Fender

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## Deployment



# Deep Draft Composite Fender

- Lift from stowed position by crane using spreader bar





# Deep Draft Composite Fender

- Lower  
move



and



# Deep Draft Composite Fender

- Spread fender, into slot

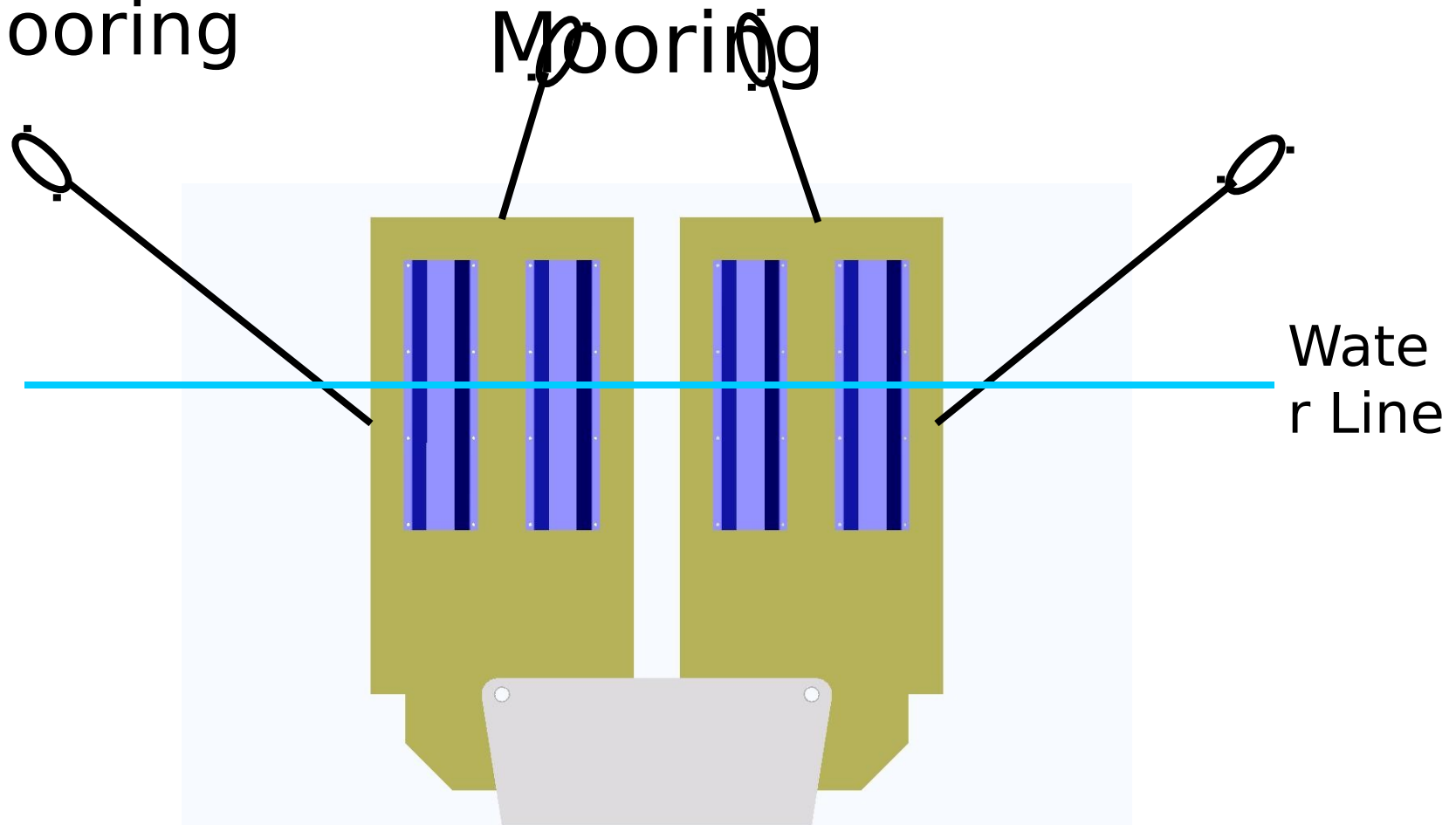


of fitting



# Deep Draft Composite Fender

- 4 taglines used for deployment & mooring





# Deep Draft Composite Fender

- Nov-Dec '02 onboard SS Flickertail State
- Practiced Handling & Deployment
- HSV-X1 Joint Venture Demonstration





# Deep Draft Composite Fender





# Deep Draft Composite Fender

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- Lessons Learned: The Good
  - Lifting and moving fenders
  - Relatively fast deployment in calm seas
  - Good stability when deployed
  - Mooring system allows precise positioning
  - Easy retrieval and stowage



# Deep Draft Composite Fender

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- Lessons Learned: The Bad
  - Mooring points deemed undersized
  - Inexperience with deployment procedures can be a problem



# Deep Draft Composite Fender

- Lessons Learned: The Ugly
  - Deployment would be very difficult in higher sea states
  - Spreader bar poses hazard to ships
  - Spreader bar “passively” locks fender in place, “active” lock is desired

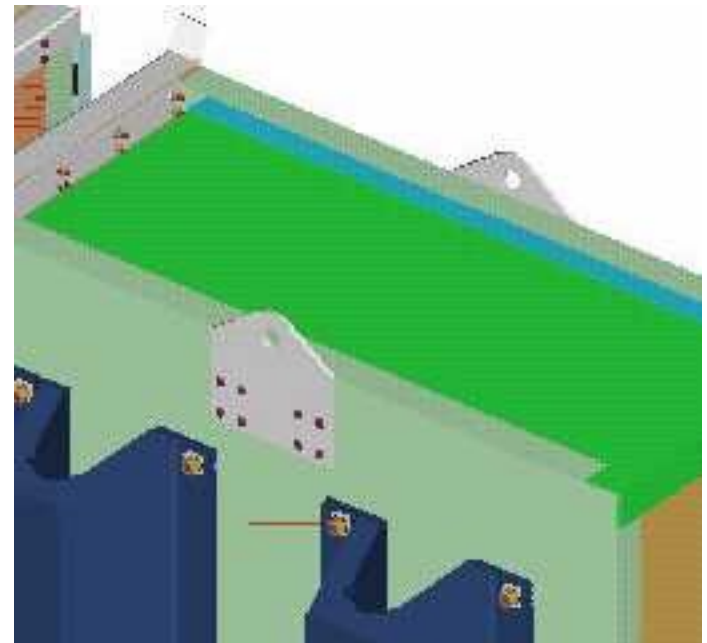




# Project Plan

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- DDCF modifications (Feb-Mar)
  - Mooring Points
  - Deployment Method
- At-Sea testing (Apr)
- Post test analysis (May -June)





# Project Plan

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- MPF study (Feb-May)
  - Stowage
  - Mooring
  - Hull interface



# Project Plan

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- DDCF redesign (June-Aug)
  - Incorporate lessons learned & test results
  - MPF study results
  - Optimize design for cost & weight
- Transition to procurement